

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (currently amended): A misfire detecting apparatus for an internal combustion engine, comprising:

an operating condition detector ~~detecting~~ that is configured to detect engine operating conditions inclusive of an engine rotation speed; and

a calculating section that is configured to:

~~judges whether or not a misfire occurred, based on the engine rotation speed detected by said operating condition detector, to output a misfire judgment signal, wherein said calculating section:~~

calculate ~~calculates~~ diagnosis data indicating a variation of said engine rotation speed ~~and also calculates speed;~~

calculate a threshold based on said engine operating conditions, ~~and judges conditions;~~

judge ~~whether or not~~ a misfire occurred, based ~~on the~~ on a comparison between the calculated ~~said~~ diagnosis data and ~~said threshold~~ the calculated threshold;

calculate data indicating an average correlation between said calculated diagnosis data and said calculated threshold;

judge whether said calculated diagnosis data becomes larger on average on the basis of said calculated threshold ~~and also calculates a correction value for correcting said threshold based on the~~ data indicating an average correlation between said calculated diagnosis data and said calculated threshold;

calculate a correction value for correcting, ~~to correct~~ said calculated threshold based on whether said calculated diagnosis data becomes larger on average on the basis of said calculated threshold; and

correct said calculated threshold ~~with~~ said correction value.

2. (currently amended): A misfire detecting apparatus for an internal combustion engine according to claim 1, wherein said calculating section is also configured to calculate ~~calculates~~ a ratio between an average value of said diagnosis data and an average value of said threshold, as said data indicating the average correlation.

3. (currently amended): A misfire detecting apparatus for an internal combustion engine according to claim 1, wherein said calculating section is also configured to calculate ~~calculates~~ an average value of ratios between said diagnosis data and said threshold, as said data indicating the average correlation.

4. (currently amended): A misfire detecting apparatus for an internal combustion engine ~~according to claim 1, comprising:~~

an operating condition detector that is configured to detect engine operating conditions inclusive of an engine rotation speed; and  
a calculating section that is configured to:

judge whether a misfire occurred, based on the engine rotation speed detected by said operating condition detector;

output a misfire judgment signal;

calculate diagnosis data indicating a variation of said engine rotation speed;

calculate a threshold based on said engine operating conditions;

judge whether a misfire occurred, based on a comparison between said diagnosis data and said threshold;

calculate a correction value for correcting said threshold based on data indicating an average correlation between said diagnosis data and said threshold, to correct said threshold with said correction value; and

calculate ~~wherein said calculating section calculates~~ a correction value, which corrects said threshold to be larger as said diagnosis data averagely approaches said threshold.

5. (currently amended): A misfire detecting apparatus for an internal combustion engine ~~according to claim 1, comprising:~~

an operating condition detector that is configured to detect engine operating conditions inclusive of an engine rotation speed; and

a calculating section that is configured to:

judge whether a misfire occurred, based on the engine rotation speed detected by said operating condition detector;

output a misfire judgment signal;

calculate diagnosis data indicating a variation of said engine rotation speed;

calculate a threshold based on said engine operating conditions;

judge whether a misfire occurred, based on a comparison between said diagnosis data and said threshold;

calculate a correction value for correcting said threshold based on data indicating an average correlation between said diagnosis data and said threshold, to correct said threshold with said correction value; and

eliminate ~~wherein said calculating section eliminates~~ said diagnosis data and said threshold ~~for when~~ when said diagnosis data is equal to or above said threshold, from samples for calculating said data indicating the average correlation.

6. (currently amended): A misfire detecting apparatus for an internal combustion engine according to claim 5, wherein said calculating section is also configured to prohibit ~~prohibits~~ an update of said correction value on the basis of said data indicating the average correlation, when the number of samples of said diagnosis data and said threshold used for the calculation of said data indicating the average correlation is less than a predetermined value.

7. (currently amended): A misfire detecting apparatus for an internal combustion engine according to claim 1, wherein said calculating section is also configured to cancel ~~cancels~~ the misfire judgment, based on said data indicating the average correlation between said diagnosis data and said threshold.

8. (currently amended): A misfire detecting apparatus for an internal combustion engine ~~according to claim 7, comprising:~~

an operating condition detector that is configured to detect engine operating conditions inclusive of an engine rotation speed; and

a calculating section that is configured to:

judge whether a misfire occurred, based on the engine rotation speed detected by said operating condition detector;

output a misfire judgment signal;

calculate diagnosis data indicating a variation of said engine rotation speed;

calculate a threshold based on said engine operating conditions;

judge whether a misfire occurred, based on a comparison between said diagnosis data and said threshold;

calculate a correction value for correcting said threshold based on data indicating an average correlation between said diagnosis data and said threshold, to correct said threshold with said correction value;

wherein said calculating section is configured to:

cancel the misfire judgment, based on said data indicating the average correlation between said diagnosis data and said threshold; and

prohibit ~~prohibits~~ said cancellation process, when a misfire frequency during a period of time ~~where~~ in which said data indicating the average correlation is obtained, is equal to or above a predetermined value.

9. (currently amended): A misfire detecting apparatus for an internal combustion engine ~~according to claim 1, comprising:~~

an operating condition detector that is configured to detect engine operating conditions inclusive of an engine rotation speed; and

a calculating section that is configured to:

judge whether a misfire occurred, based on the engine rotation speed detected by said operating condition detector;

output a misfire judgment signal;

calculate diagnosis data indicating a variation of said engine rotation speed;

calculate a threshold based on said engine operating conditions;

judge whether a misfire occurred, based on a comparison between said diagnosis data and said threshold;

calculate a correction value for correcting said threshold based on data indicating an average correlation between said diagnosis data and said threshold, to correct said threshold with said correction value; and

obtain ~~wherein said calculating section obtains said data indicating the average correlation, as an average value per the predetermined number of ignitions.~~

10. (currently amended): A misfire detecting apparatus for an internal combustion engine, comprising:

means for detecting engine operating conditions inclusive of an engine rotation speed;  
means for calculating diagnosis data indicating a variation of said engine rotation speed;

means for calculating a threshold based on said engine operating conditions;

means for judging whether ~~or not~~ a misfire occurred, based on the comparison between said calculated diagnosis data and said calculated threshold;

means for calculating data indicating an average correlation between said calculated diagnosis data and said calculated threshold;

means for judging whether said calculated diagnosis data becomes larger on average on the basis of said calculated ~~calculating a correction value for correcting said~~ threshold based on said data indicating the average ~~correction~~ correlation between said calculated diagnosis data and said calculated threshold;

means for calculating a correction value for said calculated threshold based on whether said calculated diagnosis data becomes larger on average on the basis of said calculated threshold; and

means for correcting said threshold with said correction value.

11. (currently amended): A misfire detecting method for an internal combustion engine, comprising the steps of:

detecting engine operating conditions inclusive of an engine rotation speed;  
calculating diagnosis data indicating a variation of said engine rotation speed;  
calculating a threshold based on said engine operating conditions;  
judging whether ~~or not~~ a misfire occurred, based ~~on the~~ on a comparison between said calculated diagnosis data and said calculated threshold;  
calculating data indicating an average correlation between said calculated diagnosis data and said calculated threshold;  
judging whether said calculated diagnosis data becomes larger on average on the basis of said calculated ~~calculating a correction value for correcting said threshold~~  
based on said data indicating the average ~~correction~~ correlation between said calculated diagnosis data and said calculated threshold;  
calculating a correction value for said calculated threshold based on whether said calculated diagnosis becomes larger on average on the basis of said calculated threshold; and  
correcting said calculated threshold with said correction value.

12. (currently amended): A misfire detecting method for an internal combustion engine according to claim 11, wherein said step of calculating the data indicating the average ~~correlation; correlation comprises the step of:~~

calculating ~~calculates~~ a ratio between an average value of said diagnosis data and an average value of said threshold, as said data indicating the average correlation.

13. (currently amended): A misfire detecting method for an internal combustion engine according to claim 11, wherein said step of calculating the data indicating the average ~~correlation; correlation comprises the step of:~~

calculating ~~calculates~~ an average value of ratios between said diagnosis data and said threshold, as said data indicating the average correlation.

14. (currently amended): A misfire detecting method for an internal combustion engine ~~according to claim 11, comprising the steps of:~~

detecting engine operating conditions inclusive of an engine rotation speed;  
calculating diagnosis data indicating a variation of said engine rotation speed;  
calculating a threshold based on said engine operating conditions;  
judging whether a misfire occurred, based on the comparison between said diagnosis data and said threshold;  
calculating data indicating an average correlation between said diagnosis data and said threshold;  
calculating a correction value for said threshold based on said data indicating the average correlation between said diagnosis data and said threshold; wherein said step of calculating the correction value; calculates a correction value, which correction value corrects said threshold to be larger as said diagnosis data averagely approaches said threshold; and  
correcting said threshold with said correction value.

15. (currently amended): A misfire detecting method for an internal combustion engine ~~according to claim 11, comprising the steps of:~~

detecting engine operating conditions inclusive of an engine rotation speed;  
calculating diagnosis data indicating a variation of said engine rotation speed;  
calculating a threshold based on said engine operating conditions;  
judging whether a misfire occurred, based on the comparison between said diagnosis data and said threshold;  
calculating data indicating an average correlation between said diagnosis data and said threshold;  
calculating a correction value for said threshold based on said data indicating the average correlation between said diagnosis data and said threshold; and  
correcting said threshold with said correction value,  
wherein said step of calculating the data indicating the average ~~correlation;~~ correlation comprises the step of:  
eliminating eliminates ~~said diagnosis data and said threshold for when~~ when said diagnosis data is equal to or above said threshold, from samples for calculating said data indicating the average correlation.



16. (currently amended): A misfire detecting method for an internal combustion engine according to claim 15, further comprising the ~~step of;~~ step of:

prohibiting the cancellation of the misfire judgment on the basis of said data indicating the average correlation, when the number of samples of said diagnosis data and said threshold used for the calculation of said data indicating the average correlation is less than a predetermined value.

17. (currently amended): A misfire detecting means for an internal combustion engine according to claim 11, further comprising the ~~step of;~~ step of:

canceling the misfire judgment, based on said data indicating the average correlation between said diagnosis data and said threshold.

18. (currently amended): A misfire detecting method for an internal combustion engine ~~according to claim 17, further comprising the step of;~~ comprising the steps of:

detecting engine operating conditions inclusive of an engine rotation speed;  
calculating diagnosis data indicating a variation of said engine rotation speed;  
calculating a threshold based on said engine operating conditions;  
judging whether a misfire occurred, based on the comparison between said diagnosis data and said threshold;  
calculating data indicating an average correlation between said diagnosis data and said threshold;  
calculating a correction value for said threshold based on said data indicating the average correlation between said diagnosis data and said threshold;  
correcting said threshold with said correction value;  
canceling the misfire judgment, based on said data indicating the average correlation between said diagnosis data and said threshold; and  
prohibiting the cancellation of the misfire judgment, when a misfire frequency during a period of time in which ~~where~~ said average correlation is obtained, is equal to or above a predetermined value.

19. (currently amended): A misfire detecting method for an internal combustion engine ~~according to claim 11, comprising the steps of:~~

detecting engine operating conditions inclusive of an engine rotation speed;

calculating diagnosis data indicating a variation of said engine rotation speed;

calculating a threshold based on said engine operating conditions;

judging whether a misfire occurred, based on the comparison between said diagnosis data and said threshold;

calculating data indicating an average correlation between said diagnosis data and said threshold;

calculating a correction value for said threshold based on said data indicating the average correlation between said diagnosis data and said threshold; and

correcting said threshold with said correction value,

wherein said step of calculating the data indicating the average ~~correlation;~~ correlation comprises the step of:

calculating ~~calculates~~ said data indicating the average correlation, as an average value per the predetermined number of ignitions.